

Appl. No. 10/034,296
Amdt. dated October 13, 2004
Amendment under 37 CFR 1.116 Expedited Procedure
Examining Group

PATENT

1 **Amendments to the Claims:**

2 This listing of claims will replace all prior versions, and listings, of claims in the application:

3 **Listing of Claims:**

4 1.-18 (Canceled)

1 19. (Currently amended) An aerogel monolith composite article comprising
2 an aerogel monolith and a reinforcing structure to serve as a flexible, durable, light-weight
3 insulation product wherein the reinforcing structure comprises (i) a lofty fibrous batting which
4 causes no substantial ~~degradation~~ degradation of the thermal performance of the aerogel as
5 compared with a non-reinforced aerogel body of the same material and (ii) microfibers having
6 diameters from about 0.1 to 100 μm and aspect ratios greater than 5 ~~and (iii) the aerogel~~
7 ~~monolith is not formed by joining together of aerogel particles or granules in a binder.~~

1 20. (Original) The composite of claim 19, wherein the microfibers are comprised
2 of a material having a thermal conductivity below about 200 mW/mK.

1 21. (Original) The composite of claim 19, wherein the microfibers are comprised
2 of a material that resists sintering more than the lofty fibrous batting.

1 22. (Original) The composite of claim 19, wherein the microfibers are comprised
2 of a material that reduces the transmission of infrared radiation through the composite more than
3 the lofty fibrous batting.

1 23. (Original) The composite of claim 19, wherein the microfibers are comprised
2 of a material that attenuates radio frequency waves.

1 24. (Original) The composite of claim 19, wherein the microfibers are comprised
2 of one or more materials that attenuate electromagnetic waves.

1 25. (Original) The composite of claim 19, wherein the microfibers are selected
2 from the group consisting of carbon fibers and copper fibers.

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1 26. (Original) The composite of claim 19, wherein at least one of the following
2 properties varies within spatial locations of the composite: microfiber material; microfiber size;
3 microfiber aspect ratio; and microfiber quantity.

1 27. (Original) The composite of claim 19, wherein a material having a high
2 thermal conductivity equal to or greater than 1 W/mK is added on the x-y axis of the composite
3 structure in addition to the lofty batting.

1 28. (Original) The composite of claim 27, wherein the high thermal conductivity
2 material comprises a metal.

1 29. (Original) The composite of claim 28, wherein the high thermal conductivity
2 material is a metal which is sufficiently malleable to provide conformability to the composite to
3 enable the composite to retain its shape after bending.

1 30. (Original) The composite of claim 29, wherein the metal is selected from the
2 group consisting of copper and steel.

1 31. (Original) The composite of claim 27, wherein the high thermal conductivity
2 material is in a porous form selected from the group consisting of mesh, sheet, perforated sheet,
3 foil, and perforated foil.

1 32. (Original) The composite of claim 27, wherein the composite has an x-y
2 horizontal plane and a z vertical plane and the thermally conductive materials are oriented in the
3 x-y plane of the composite.

1 33. (Original) The composite of claim 27, wherein the high thermal conductivity
2 material conducts heat away from a localized heat load and emits it to the environment.

1 34. (Currently amended) The composite of claim 33 ~~in combination with~~
2 further comprising a heat sink, wherein the heat is emitted to the environment by means of the
3 heat sink.

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1 35. (Original) The composite of claim 27, wherein the high thermal conductivity
2 material conducts heat away from a localized heat load to a process which uses the thermal
3 energy directly.

1 36. (Currently amended) The composite of claim 27 ~~in combination with~~
2 further comprising device which converts the thermal energy to electrical energy, wherein the
3 high thermal conductivity material conducts heat away from a localized heat load and into the
4 device.

1 37. (Original) The composite of claim 27, wherein the high thermal conductivity
2 material comprises carbon fibers.

1 38. (Currently amended) An aerogel monolith composite article comprising
2 an aerogel monolith and a reinforcing structure to serve as a flexible, durable, light-weight
3 insulation product wherein the reinforcing structure comprises (i) a lofty fibrous batting which
4 causes no substantial degradation of the thermal performance of the aerogel as compared with a
5 non-reinforced aerogel body of the same material and (ii) one or more high thermal conductivity
6 materials having a thermal conductivity of equal to or greater than 1 W/mK, ~~and (iii) the aerogel~~
7 ~~monolith is not formed by joining together of aerogel particles or granules in a binder.~~

1 39. (Original) The composite of claim 38, wherein the high thermal conductivity
2 material comprises a metal.

1 40. (Original) The composite of claim 38, wherein the high thermal conductivity
2 material is a metal which is sufficiently malleable to provide conformability to the composite to
3 enable the composite to retain its shape after bending.

1 41. (Original) The composite of claim 40, wherein the metal is selected from the
2 group consisting of copper and steel.

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1 42. (Original) The composite of claim 38, wherein the high thermal conductivity
2 material is in a porous form selected from the group consisting of mesh, sheet, perforated sheet,
3 foil, and perforated foil.

1 43. (Original) The composite of claim 38, wherein the composite has an x-y
2 horizontal plane and a z vertical plane and the high thermal conductivity material is oriented in
3 the x-y plane of the composite.

1 44. (Currently amended) The composite of claim 38, wherein the high
2 thermal conductivity material conducts heat away from a localized heat load and emits it to the
3 ~~environ-ment~~ environment.

1 45. (Currently amended) The composite of claim 44, wherein the heat is
2 emitted to the ~~environ-ment~~ environment by means of a heat sink.

1 46. (Original) The composite of claim 38, wherein the high thermal conductivity
2 material conducts heat away from a localized heat load to a process which uses the thermal
3 energy directly.

1 47. (Original) The composite of claim 38, wherein the high thermal conductivity
2 material conducts heat away from a localized heat load and into a device which converts the
3 thermal energy to electrical energy.

1 48. (Original) The composite of claim 38, wherein the high thermal conductivity
2 material comprises carbon fibers.